

## **Endogenous Meningococcal Endophthalmitis In a Well Infant**

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*Abstract.* Endogenous bacterial endophthalmitis has become a rare occurrence after the widespread use of modern antibiotics. This study reports on a healthy infant who developed meningococcal endogenous endophthalmitis at the age of five months.

*Keywords:* Endogenous endophthalmitis, *Neisseria meningitidis*, Bacterial endophthalmitis.

### **Introduction**

Endophthalmitis is defined as bacterial or fungal infection within the eye, including involvement of the vitreous and/or aqueous humors. If other organisms are involved, the term "uveitis" is usually used. In most cases, the source of infection is exogenous, *e.g.*, trauma, eye surgery, or as an extension of keratitis. In such cases, the aqueous humor may be seeded first before extension into the vitreous; only a minority is endogenous. In these cases, bacteremia or fungemia end in seeding the highly vascular choroid first, then extending anteriorly to the vitreous.

Endophthalmitis is almost always bacterial. It presents acutely and is considered a vision-threatening condition; therefore, it must be

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managed as an emergency case. The clinical outcome depends on both, upon the virulence of the infecting organism and the promptness of initiating appropriate therapy<sup>[1]</sup>.

Endogenous bacterial endophthalmitis may be present with variable symptom. These may be systemic due to bacteremia, or local in the form of eye pain and diminished vision. Fever is not frequently present. Patients who do not have systemic symptoms may initially be misdiagnosed as having noninfectious uveitis. Endophthalmitis should be considered in any patient complaining of decreased vision or eye pain in the setting of possible bacteremia or the use of injection drug<sup>[2]</sup>.

The diagnosis of endogenous endophthalmitis is established by clinical findings consistent with endophthalmitis (*e.g.*, vitritis, hypopyon) in the setting of positive blood cultures; by positive vitreous; aqueous cultures in patients presenting with endophthalmitis; or patients who do not have a history of recent eye trauma or surgery. Blood cultures are positive in 75 percent of those tested, as are vitreous cultures<sup>[3]</sup>.

### **Case Presentation**

J.H. is a previously healthy 5-month-old Caucasian boy who was admitted to the children hospital with a five-day history of fever and left eye swelling that started on the same day.

Onset of symptoms was five days earlier with high grade fever of 40°C and generalized rash. However, he was doing well with good general condition. He was presented to the local town hospital where he was diagnosed with roseola and was sent home with symptomatic treatment. No investigations were done.

The rash resolved in 2 days while the fever persisted. Then, he developed left upper eyelid swelling and redness; his eyes looked cloudy. He started to be very irritable and vomited with feeding as well. He was taken to the ER for reassessment. At this point, he was transferred to the children's hospital to be seen by an ophthalmologist.

Review of the systems was unremarkable. There was no history of trauma. His past medical history revealed that he was a term baby; born by spontaneous vaginal delivery after uncomplicated pregnancy; no hospital admissions and no previous surgeries done. He received his 2 and 4 month vaccinations, his developmental and nutrition status were

normal. He had no allergies, and he had no contact with an infectious source, though, they had 4 cats and 2 dogs. He is the only child to a healthy mother 19-years-old student and a healthy 22-years-old father who works in the army. They had not been travelling recently.

On examination, he had a temperature of 39.2°C. Pulse was 110/min and respiratory rate was 20/min. He was fussy and crying, thus his general exam was normal. Head and neck examinations showed a swollen red left upper eyelid with white pupil (Fig. 1-3).



**Fig. 1. Corneal cloudiness of the left eye.**



**Fig. 2. Left eyelid redness and swelling.**



**Fig. 3. Left white pupil (Leucocoria).**

Investigations done at the children's hospital were as follows:

- CBC showed elevated WBC ( $20.2 \times 10^9/l$ ) with neutrophils presenting 77%; Hemoglobin was 11 g/dl and platelets  $664 \times 10^9/l$ .
- CRP was 9.8.
- Blood and urine cultures were negative.

The patient was admitted to the hospital and started on IV cefotaxime and vancomycin; pending cultures and sensitivity. Urgent ophthalmology consultation was in place and a head computed tomography (CT) was ordered.

A CT scan of the head showed left orbital oedema and significant inflammatory process with thickening and inflammation of the sclera consistent with endophthalmitis.

The patient was taken to the operating room where he had an exploration of the left globe and given intravitreal antibiotics (ceftazidime and vancomycin). Cultures from the vitreous fluid were sent and the result was Gram negative diplococci (*Neisseria meningitidis*). The patient was then switched to IV Penicillin G for 3 weeks according to sensitivity, and vancomycin was discontinued. Contacts were started on rifampicin prophylaxis as well. The patient was discharged home after 3 weeks of IV antibiotics. His fever was resolved as well as his left eye swelling and redness was also resolved, but unfortunately, he lost vision in the left eye.

## Discussion

The disease course in our patient is exceptionally uncommon. The patient was a 5-month-old infant who was previously healthy. He was fully immunized with no known risk factors. In this case endophthalmitis was endogenous secondary to meningococcal bacteremia. The presenting clinical picture was dominated by the systemic manifestations. Fever was the first symptom, which is reported in about 20% of endogenous endophthalmitis cases<sup>[3]</sup>. Rash was also present in the beginning and might have been due to meningococemia. However, it was misdiagnosed as roseola since the baby was well at his first presentation. Localizing ocular symptoms and signs were absent up to the 5<sup>th</sup> day of the fever. Systemic upset was evident on the second presentation since the patient was fussy and irritable.

Endophthalmitis is commonly associated with intraocular surgery or penetrating trauma to the eye. Post surgical infection complicates no more than 0.2% of operated patients<sup>[4-6]</sup>. Endogenous endophthalmitis is a very rare entity. Only a few cases were reported all over the world. A retrospective review of a 10 year period at a large acute care hospital and an adjoining eye specialty hospital in the USA identified only 28 cases<sup>[2]</sup>. Before the modern antibiotic era, the most common form of endophthalmitis was endogenous meningococcal disease, occurring in about 5% of meningococcal cases<sup>[7]</sup>. Meningococci seem to have a high affinity to invade the choroid. Recently, endogenous endophthalmitis is more commonly seen in immunocompromised patients, diabetics, and intravenous drug users. *Bacillus cereus* has replaced *Neisseria meningitidis* as the leading causative bacterial agent<sup>[7]</sup>. Even so, metastatic bacterial endophthalmitis is relatively unusual, with 72 reported cases between 1976 and 1985; eight of which were caused by *Neisseria meningitidis*<sup>[8]</sup>. Since then and up to the late 1990s, only five other cases have been attributed to meningococci<sup>[9-11]</sup>.

Beynon and Hague in 1990 reported a 58-year-old woman who developed endophthalmitis and pericarditis secondary to meningococcal infection. She made a good recovery despite the retinal detachment that complicated the course of her disease<sup>[12]</sup>. There was another report of a 17-year old male who presented with misty vision and pain in his right eye for one day. However, he had mild fever, myalgia, arthralgia and sore throat in the preceding 4 days. He also had a vesicular rash on his

hands and feet. Uveitis was treated using local corticosteroids and *mydriatics* with initial improvement. Unfortunately, the vision suddenly deteriorated 48 hours later. Despite the use of intravitreal vancomycin, ceftazidime and amphotericin B, vision was not recovered. This was exemplary of an atypical presentation of metastatic endophthalmitis<sup>[7]</sup>.

There was another report of a 7-month-old boy who developed ophthalmitis who had a widespread rash, cough, poor feeding and diarrhea. He had been unwell and his eyes were described by his mother as being 'blood shot'. Eye inflammation as well as low grade fever persisted even after successful treatment of meningococcal septicemia. This was attributed to an immunological response to the primary infection<sup>[13]</sup>.

The case study closest to ours may be the one reported by Auerbach and colleagues in 1989. They described a 13-month-old boy with endophthalmitis, a spontaneously resolving rash, and persistent pyrexia. *Neisseria meningitidis* was found in the vitreous, but without blood. Diagnosis was delayed by the atypical presentation. Therefore, residual vision was slight, despite appropriate topical and intravenous antibiotics<sup>[9]</sup>. The poor visual outcome following metastatic meningococcal endophthalmitis was reported in different cases, even after appropriate aggressive treatment and in different age groups<sup>[13-17]</sup>.

## Conclusion

Despite the fact that meningococcal endogenous endophthalmitis is a rare incidence nowadays, it still needs to be considered in the differential diagnosis. Early recognition is very important for a good recovery. However, diagnosis may be delayed if meningococcal rash is misdiagnosed especially in well patients.

## References

- [1] **Pflugfelder SC, Flynn HW.** Infectious endophthalmitis. *Infect Dis Clin North Am* 1992; **6**(4): 859-873.
- [2] **Okada AA, Johnson RP, Liles WC, D'Amico DJ, Baker AS.** Endogenous bacterial endophthalmitis: Report of a ten-year retrospective study. *Ophthalmology* 1994; **101**(5): 832-838.
- [3] **Binder MI, Chua J, Kaiser PK, Procop GW, Isada CM.** Endogenous endophthalmitis: an 18-year review of culture-positive cases at a tertiary care center. *Medicine (Baltimore)* 2003; **82**(2): 97-105.

- [4] **Javitt JC, Vitale S, Canner JK, Street DA, Krakauer H, McBean AM, Sommer A.** National outcomes of cataract extraction: Endophthalmitis following inpatient surgery. *Arch Ophthalmol* 1991; **109**(8): 1085-1089.
- [5] **Kattan HM, Flynn HW Jr, Pflugfelder SC, Robertson C, Forster RK.** Nosocomial endophthalmitis survey: Current incidence of infection after intraocular surgery. *Ophthalmology* 1991; **98**(8): 1147-1148.
- [6] **Aaberg, TM Jr, Flynn, HW Jr, Schiffman, J, Newton, J.** Nosocomial acute-onset postoperative endophthalmitis survey: A 10-year review of incidence and outcomes. *Ophthalmology* 1998; **105**(6): 1004-1010.
- [7] **Sleep T, Graham M.** A case of meningococcal endophthalmitis in a well patient. *Br J Ophthalmol* 1997; **81**(11): 1016-1017.
- [8] **Greenwald MJ, Wohl LG, Sell CH.** Metastatic bacterial endophthalmitis: a contemporary reappraisal. *Surv Ophthalmol* 1986; **31**(2): 81-101.
- [9] **Auerbach SB, Leach CT, Bateman BJ, Sidikaro Y, Cherry LD.** Meningococcal endophthalmitis without concomitant septicaemia or meningitis. *Pediatr Infect Dis J* 1989; **8**(6): 411-413.
- [10] **Kearns AM, Sprott MS.** Endophthalmitis caused by *Neisseria meningitidis*. *J Infect* 1991; **22**(3): 299-300.
- [11] **Abousaasha F, Dogar GF, Young BJ, O'Hare J.** Endophthalmitis as a presentation of meningococcal septicaemia. *Ir J Med Sci* 1993; **162**(12): 495-496.
- [12] **Beynon HL, Hague S.** Meningococcal endophthalmitis and pericarditis. *J R Soc Med* 1990; **83**(5): 331.
- [13] **Mahdi G, Tutton M, Evans-Jones G.** Ophthalmitis in meningococcal disease. *Arch Dis Child* 1988; **63**(5): 550-551.
- [14] **Wong JS, Chan TK, Lee HM, Chee SP.** Endogenous bacterial endophthalmitis: An East Asian experience and a reappraisal of a severe ocular affliction. *Ophthalmology* 2000; **107**(8): 1483-1491.
- [15] **Cheng YK, Leo SW, Edwards CJ, Koh ET.** Primary meningococcal arthritis and endogenous endophthalmitis: a case report. *Ann Acad Med Singapore* 2003; **32**(5): 706-709.
- [16] **Agrawal P, Yellachich D, Kirkpatrick N.** Retinal detachment following meningococcal endophthalmitis. *Eye (Lond)* 2007; **21**(3): 450-451.
- [17] **Chhabra MS, Noble AG, Kumar AV, Mets MB.** *Neisseria meningitidis* endogenous endophthalmitis presenting as anterior uveitis. *J Pediatr Ophthalmol Strabismus* 2007; **44**(5): 309-310.

## التهاب داخلي في العين، بسبب عدوى داخلية بالمكورات السحائية في رضيع بصحة جيدة

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*المستخلص.* الالتهاب الداخلي للعين الناتج عن امتداد داخلي للعدوى أمر نادر الحدوث. وفي هذه الورقة نقدم إحدى هذه الحالات في طفل رضيع يتمتع بصحة جيدة.